What is claimed is:

1. A filtering apparatus in an 8 Phase Shift Keying (8PSK) system, the 8PSK system being utilized for encoding a series of digital bits to output a plurality of corresponding modulation signals, the 8PSK system comprising:

   a Gray mapping module for mapping a set of every 3 digital bits into a corresponding first vector by a predetermined mapping process;

   a $3\pi/8$ phase shift module for shifting the phase of the first vector from the Gray mapping module to generate a corresponding second vector by a predetermined phase shift process; and

   a filtering apparatus for filtering the second vector from the $3\pi/8$ phase shift module to generate one corresponding modulation signal out of the plurality of modulation signals;

   the filtering apparatus further comprising:

   a $\pi/16$ phase shift module for further shifting the second vector from the $3\pi/8$ phase shift module with $\pi/16$ radians to generate a corresponding third vector;

   a weight distribution module for distributing a plurality of selected weights to a predetermined distribution waveform and for storing a plurality of corresponding weighted distribution waveforms; and

   a combination module, according to the third vector, for determining which weight distribution waveforms to be selected from the weight distribution module and combining the selected weighted distribution waveforms to generate the modulation signal.

2. The filtering apparatus of claim 1, wherein the set of every 3 digital bits mentioned in the above constitutes 8 different permutations, and the predetermined mapping process comprises: mapping each permutation of the 3 digital bits into the corresponding first vector having the same magnitude but different phase, and the phase difference between the adjacent first vectors being $\pi/4$.

3. The filtering apparatus of claim 1, wherein the predetermined phase shift process comprises: each time the phase of the current first vector shifted by the $3\pi/8$ phase shift module being a phase of the sum of the phase of the previous first vector shifted by the $3\pi/8$ phase shift module plus $3\pi/8$ radians, and thereby generating the corresponding second vectors.

4. The filtering apparatus of claim 2, wherein the plurality of second vectors generated by the $3\pi/8$ phase shift module constitute only 16 different possibilities, and the phase difference between the adjacent second vectors is $\pi/8$.

5. The filtering apparatus of claim 1, wherein the plurality of third vectors generated by the $\pi/16$ phase shift module constitute only 16 different possibilities, and the phase difference between the adjacent third vectors is $\pi/8$.

6. The filtering apparatus of claim 5, wherein each the plurality of third vectors is composed of a real part and an imaginary part, the real part is composed of a real-part magnitude and a real-part sign digit, the real-part magnitude represents the absolute value of the real part, and the real-part sign digit represents the positive or negative sign of the real part; the imaginary part is composed of an imaginary-part magnitude and an imaginary-part sign digit, the imaginary-part magnitude represents the absolute value of the imaginary part, and the imaginary-part sign digit represents the positive or negative sign of the imaginary part.

7. The filtering apparatus of claim 6, wherein all the plurality of corresponding real-part magnitudes and imaginary-part magnitudes of the third vectors are selected from one of the following combinations: $\cos(\pi/16)$, $\cos(3\pi/16)$, $\cos(5\pi/16)$, and $\cos(7\pi/16)$.

8. The filtering apparatus of claim 1, wherein the weight distribution module is accommodated in the combination module, and the plurality of weights selected by the weight distribution module is one of the following combinations: $\cos(\pi/16)$, $\cos(3\pi/16)$, $\cos(5\pi/16)$, and $\cos(7\pi/16)$.

9. The filtering apparatus of claim 8, wherein all the third vectors are derivable from the selected weights by the weight distribution module via mathematical

trigonometric function.

10. The filtering apparatus of claim 1, wherein the combination module further comprises:

    an encoder, according to the phase of each of the third vectors, for encoding the third vector to generate a corresponding encoding signal; and

    a shift register comprising a plurality of buffer units for temporarily storing the plurality of current and previous encoding signals generated by the encoder.

11. The filtering apparatus of claim 10, wherein each of the plural encoding signals comprises a real-part magnitude code, a real-part sign code, an imaginary-part magnitude code, and an imaginary-part sign code.

12. The filtering apparatus of claim 11, wherein the modulation signal comprises a real-part modulation signal and an imaginary-part modulation signal.

13. The filtering apparatus of claim 12, wherein the combination module further comprises:

    a controller, for selecting the corresponding weighted distribution waveforms from the weight distribution module in responsive to the real-part magnitude codes in the buffer units;

    a sign designator, under the control of the controller, for designating the corresponding positive or negative sign to the weighted distribution waveforms selected by the controller in responsive to the real-part sign codes; and

    a summation module for summing up the plurality of weighted distribution waveforms after the sign designator completes the sign designation, to generate the real-part modulation signal.

14. The filtering apparatus of claim 13, wherein the controller further selects the corresponding weighted distribution waveforms from the weight distribution module in responsive to the imaginary-part magnitude codes in the buffer units; and the sign designator, under the control of the controller, designates the

corresponding positive or negative sign to the weighted distribution waveforms selected by the controller in responsive to the imaginary-part sign codes; and the summation module sums up the plurality of weighted distribution waveforms after the sign designator completes the sign designation, to generate the imaginary -part modulation signal.

15. The filtering apparatus of claim 13, wherein the sign designator comprises a plurality of sign designation units, and each of the sign designation units designates the corresponding positive or negative sign to the weighted distribution waveforms selected by the controller according to the real-part sign codes and the imaginary-part sign codes.

16. The filtering apparatus of claim 1, wherein the predetermined distribution waveform is divisible to be a plurality of sub-distribution waveforms, the weight distribution module comprises a memory having a plurality of memory units, and each memory unit is utilized to store a plural weighted sub-distribution waveforms after the corresponding weights are distributed to the sub-distribution waveforms.

17. A filtering method in an 8 Phase Shift Keying (8PSK) system, the 8PSK system being utilized for encoding a series of digital bits to output a plurality of corresponding modulation signals, the 8PSK system comprising:

a Gray mapping module for mapping a set of every 3 digital bits into a corresponding first vector by a predetermined mapping process;

a $3\pi/8$ phase shift module for shifting the phase of the first vector from the Gray mapping module to generate a corresponding second vector by a predetermined phase shift process; and

a filtering apparatus for filtering the second vector from the $3\pi/8$ phase shift module to generate one corresponding modulation signal out of the plurality of modulation signals;

the filtering method further comprising:

shifting the second vector from the $3\pi/8$ phase shift module with $\pi/16$ radians to generate a corresponding third vector;

distributing a plurality of selected weights to a predetermined distribution waveform to generate a plurality of corresponding weighted distribution waveforms and being stored in a weight distribution module; and

according to the third vector, determining which weight distribution waveforms to selected from the above and combining the selected weighted distribution waveforms to generate the modulation signals.

18. The filtering method of claim 17, wherein the filtering method further comprises:

according to the phase of each of the third vectors, encoding the third vector to generate a corresponding encoding signal;

temporarily storing the plurality of current and previous encoding signals generated by the encoder.

19. The filtering method of claim 18, wherein each of the plural encoding signals comprises a real-part magnitude code, a real-part sign code, an imaginary-part magnitude code, and an imaginary-part sign code, the modulation signal comprises a real-part modulation signal and an imaginary-part modulation signal, and the filtering method further comprises:

selecting the corresponding weighted distribution waveforms from the weight distribution module in responsive to the real-part magnitude codes;

designating the corresponding positive or negative sign to the weighted distribution waveforms selected by the controller in responsive to the real-part sign codes; and

summing up the plurality of weighted distribution waveforms after the sign designator completes the sign designation, to generate the real-part modulation signal.

20. The filtering method of claim 19, wherein the filtering method further comprises:

selecting the corresponding weighted distribution waveforms from the weight distribution module in responsive to the imaginary-part magnitude codes;

designating the corresponding positive or negative sign to the weighted distribution waveforms selected by the controller in responsive to the

imaginary-part sign codes; and

summing up the plurality of weighted distribution waveforms after the sign designator completes the sign designation, to generate the imaginary-part modulation signal.